

PATHWAYS

VOL. XII

NOVEMBER 1990

No. 4

APT ADAGES ?

Every teacher of English will be able to complete these similes which compare human beings with common animals, birds and insects.

- i) As filthy as
- ii) As wise as
- iii) As busy as
- iv) As stubborn as
- v) As blind as
- vi) As busy as

How many of them are true to life ? Are the comparisons apt ? Turn to page 2 and check.

Use these adages with your students in a research project. Ask students to find out if these qualities are really appropriate to the animal. The encyclopaedias in your school library might be a good point to start the enquiry. In the process of finding out, students will use library and reading comprehension skills. In sharing their findings with classmates, they can develop a variety of communication skills.

APT ADAGES ?

- i) **As filthy as a pig** : Pigs are often thought to be filthy animals who wallow in mud. Actually, if pigs are given a choice they will keep themselves cleaner than most other farm animals.
Pigs actually wallow in mud to find relief from the heat. They lack a perspiration system to keep them cool. Pigs are not stupid either. In intelligence they rank above cattle, horses and sheep.
- ii) **As wise as an owl** : The owl's reputation for being wise has not been supported by laboratory tests and experiments. Geese, crows and ravens have been found to be "smarter". Perhaps the owl's large eyes were thought to be synonymous with wisdom, making owls wiser than other animals.
- iii) **As busy as a bee** : "Busy as a Bee" is only partially true. Worker bees, female, do most of the work in a bee hive. One queen bee and several hundred male drones make up the rest of the hive. Worker bees feed the drones and take care of them till one gets to mate with the queen. After that the drones are driven out of the hive.

- iv) **As stubborn as a mule** : A mule might be considered stubborn in the sense that when forced to work hard and for a long time, it tries to save its strength. Mules are less likely to suffer from overwork than horses. Mules are intelligent enough not to struggle if they are in a situation which might hurt them.
- v) **As blind as a bat** : Bats are not blind. Most bats, however, can't see very well in bright sunlight. Bats fly at night, hunting for food. They give out a rapid series of high-pitched squeaks. The squeaks are reflected from anything in front of the bat. These echoes are heard by the bat which makes a mental picture from the echoes.
- vi) **As busy as a beaver** : If someone says you are as busy as a beaver they mean you are working hard. Beavers always seem to be working. From early spring to late fall, all members of a beaver colony can be observed busily cutting trees, building and repairing dams and lodges, and cutting twigs for their winter food supply. Beavers are intelligent and successful animal "engineers".

Curtain Rod Bridge

Metal bridges expand and contract as their temperature changes. They are usually set on rollers to allow for this. What takes place may be shown with a model bridge made from a discarded metal curtain rod that is about a metre long and straight.

Support its ends on two similar smooth wooden blocks set on a table and taped in place so that they will not slide. Tape one end of the "bridge" firmly to one "pier". Then stick a pin through the middle of a shortened drinking straw to serve as a pointer, set it on the other "pier" and rest that end of the "bridge" on it.

Set several short candles under the "bridge" and light them. What happens to the pointer? Why is this? What will it do if the flames are put out? If crushed ice is sprinkled gently on the "bridge"? Let pupils check to see.

The pointer shows how much the "bridge" changes in length. One full turn would indicate a change equal to twice the circumference of the pin. To make this clear, roll a stick across a cardboard tube on a table, measure how far the stick moves when the tube makes one turn, and compare this distance with that around the tube. To find the circumference of the pin, roll a centimeter ruler across it as it lies on the block with the pointer over the edge, note how far the ruler moves with respect to the pin when the pointer makes 10 turns, and divide this distance by 10.

On the basis of these tests with one metal rod, is it valid to say, "Metals expand when heated?" What should one do before making such a sweeping generalization? What can you conclude from the evidence you have?

Innovative Approaches to the Teaching of Mathematics at Primary School

Before proceeding further, I would invite readers to take a look at the number square given below. Study the arrangement of numbers to see how many patterns you can find. Some possibilities are given below.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

A. Put your finger on any number.

i) add 1, 2, 3, 4, etc.

ii) subtract 1, 2, 3, 4 etc.

iii) add 10, 20, 30 etc.

iv) subtract 10, 20, 30 etc.

v) add 11, 22, 33, 44 etc.

vi) subtract 11, 22, 33, 44 etc.

vii) add 9, 18, 27, 36 etc.

viii) subtract 9, 18, 27, 36 etc.

ix) add 11, 12, 13, 14 etc.

x) subtract 11, 12, 13, 14 etc.

xi. add 22, 23, 32, 33, 34, 42, 43 etc.

xii. subtract 22, 23, 32, 33, 34 etc.

- B. Next take any 3 x 3 square from the 10 x 10 diagram

23	24	25
33	34	35
43	44	45

Observe the patterns when you

- i) add the numbers vertically in columns
 - ii) add horizontally in rows.
 - iii) add diagonally
 - iv) add the central column
 - v) add the central row
 - vi) From the centre .
 - a) go to the top left corner and then go to the bottom right corner.
 - b) go to the top right corner and then go to the bottom left corner
 - vii) Find the relationship between the two outer numbers and the central one in each row.
 - viii) Find the averages of the each row and column.
 - ix) Find the averages of the diagonals.
 - x) Find the average of the four corner numbers
 - xi) Find the average of the eight outer numbers.
 - xii) Find the average of all the nine numbers
- C. Go back to the 10 x 10 square. Shade in multiples of 2, 3, 4, 5 etc. using a different colour for each set. Observe the patterns formed by each colour you have used. What does each represent?

On some squares you would have used more than one colour. What numbers are these?

How can you use these to find the Lowest Common Multiple of given numbers?

[Children can observe these patterns even better if you make overlays having blank squares cut-out corresponding to squares you have shaded. Place each overlay on the square to see the pattern of one multiplication table

Place two overlays one on top of the other, say the patterns of two and three times table. What do you see now?

These are only some of the patterns to be discovered in this number square.

Once you have familiarized yourself (or your students) with the location of numbers on this grid you (or your students) can (almost blindfolded) place your finger on any number of your choice on a blank grid and move around according to any given number relationships.

The Importance of Creating Interest in Children

I have spent several *interesting* hours *absorbed* in the discovery of *number patterns* in a 10 x 10 number square. And *patterns* is what mathematics is all about. A small exercise of this kind opens our eyes to the possibilities of making mathematics "come alive" for our students. Obviously maths learnt this way is neither a chore, a bore nor easily forgotten. The child can become an active explorer, rather than a passive recipient of knowledge. Most often this "knowledge" consists of a collection of facts, axioms, rules, tables etc. to be remembered, practised and *sometimes* applied.

Teacher's Attitudes

One important aspect that must be emphasised is that the *teacher too* has to have *curiosity, interest in the subject and the willingness to seek new and interesting ways of presenting* it to the students. If the child is to discover

for himself/herself, *the teacher must not tell*; the teacher must merely guide, *lead or point the child* in the correct direction. The child has to be *encouraged* to work on his/her own—and the reward must be the satisfaction of finding out, of solving problems on one's own, *not* obtaining the highest marks in the class.

Ways of Creating Interest

Creation of interest can be carried out in several ways :-

- * Using puzzles, riddles, number squares etc. to sharpen thinking skills, to provide opportunities for practice of rules learnt, to provide opportunities to apply knowledge gained in regular classes.
- * Setting exercises in the context of the child's world of today. For example, children may find verbal problems involving totalling of different kinds of fruits, to be less appealing than say finding the total of cricket scores. Comparing the actual costs of television sets, toys and gadgets would specially interest the urban child.
- * There is an ever-present need for *drilling*, no matter what the subject. Multiplication tables, for example, must be remembered to allow for quick computation in later years. An innovative teacher will select a variety of drilling techniques so that the students achieve their goal without boredom. Games, rhymes, songs are some possibilities. *Group work* permits the more able students to help the slower ones. Here, it is to be noted, that the teacher's aim should be *co-operation amongst students to help everyone succeed*.
- * Any subject that is presented to students in *difficult language with abstract terminology* is bound to "put off" students. Unfortunately this often happens both in Science and Mathematics. The problem may be inherent in the topic being studied; it may be in language used in the textbook; it may even lie in the language used by the teacher when explaining the concepts in

class. The teacher may come away feeling very satisfied that he/she has done a good job—but the next test results provide a very disquieting feedback. How often this has happened!

The alert teacher recognises this as a pointer to the need for using different classroom strategies. *The communication gap has to be bridged.*

- * Another major problem at the primary level is our tendency to straight away lead the students into the formal, abstract world of mathematics. We forget that the children of the age group 5—10 or 11 years, who are in these classes, are *at a concrete operational level of mental development*. Often *practical exercises in mathematics* are totally ignored. Thus the metric tables of measurement are taught on the blackboard, and memorised, but opportunities for measuring objects, selecting and using appropriate units are overlooked. One more boring table has been added to the long list to be learnt by the children. Concepts of area and volume involving two and three-dimensional space are too often taught only through the chalk and talk method. Ask any child of the middle school what area is. The invariable answer is "Length X Breadth", or worse, " $L \times B$ ". Like wise volume is $L \times B \times H$ —a mere formula! Providing students with a practical exercise using paper, card and a variety of containers can concretise these fundamental concepts and link them to life.

Activities of this kind are best done before formal learning. They involve the children both physically and mentally. It is important to give clear instructions on what is to be done by the students and then to allow them to get on with it. The teacher needs to be "a guide on the side" leading the students towards discovery of a concept or solution of a problem. Once concepts and explanations are clear, drilling may follow.

* It is important for the teacher to *present a new topic in small, incremental steps*. This makes for thorough understanding and allows the teacher to test and obtain feedback more than once. Remedial instruction is much easier and gaps in the students' understanding are easily filled in. To achieve such effective teaching, it is helpful to clarify one's objectives and then break them down into several sub-objectives. This helps in planning a series of lessons which achieve the goal painlessly—both

for the teacher and the taught.

Much of this has been said before, but it bears thinking about. If we are to overcome the average primary student's mental block that mathematics is a difficult, boring subject, we have to actively seek ways and means of preventing it from degenerating into just that!

Jose Paul
EPG

MATH CLUB IDEAS-4

Computing Sums with Natural Numbers

The Mathematics teacher in the classroom has always struggled to teach summation, using natural numbers or their powers. A play-way method to compute such sums, using cardboard models, will leave a good impact on the learner's mind.

The following activity is easily carried out using cut-outs made from the squared paper available in number work books used by primary school students.

1. The Sum of the first n natural numbers:

Let students cut out cardboard rectangles of unit width and lengths equal to the natural numbers, say 1-5.

This example is shown here.

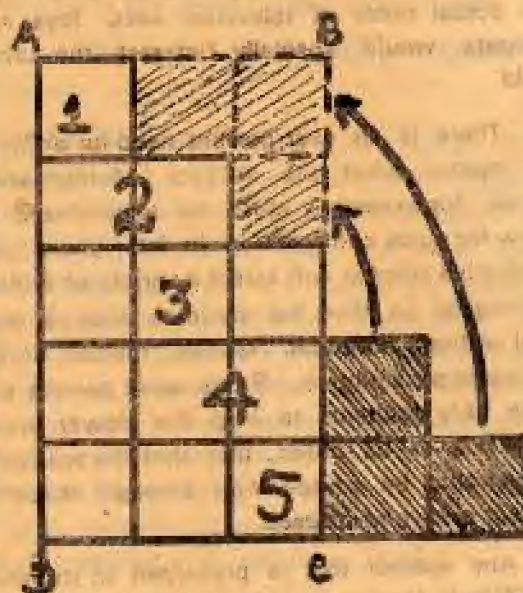
Ask them to cut the last few rectangles as shown and fill up the gaps to make up one complete large rectangle.

Now, compute the area of the rectangle. This will give you the sum of the first n natural numbers.

Repeat this exercise for other values of n .

When students become familiar with such manipulation, let them compute the sum from any natural number to any other natural number.

(Hint for the teacher: The sum of natural numbers from 5 to 10 is equal to sum of natural numbers from 1 to 10 minus the sum of natural numbers from 1 to 4).



$$DC = \frac{1}{2} (n+1)$$

$$AD = n$$

$$\text{Therefore } AD \cdot DC = \frac{1}{2} n (n+1)$$

2. The sum of the squares of the first n natural numbers

Ask students to make 3 sets of cardboard squares of sides 1 to 6 units. Cut out the squares along their outlines.

One set must be arranged as given in the figure here.

Ask students to do some cutting and arranging so that all the three sets put together form a rectangle with the height as shown. If required the second and third sets may be cut into unit squares or strips. The large rectangle gives three times the sum of the squares of the first 6 natural numbers.

What is the width of the rectangle in terms of unit squares?

Repeat the exercise with different values of n , for example $n=5$, 4 and 3.

In each case find the width of the rectangle in terms of unit squares? Find a single expression which will give the width of the rectangle in terms of ' n ' in all cases. (Hint: This is equal to $2n+1$).

The total area of the rectangle = $\frac{1}{2}n(n+1)(2n+1)$ = three times the sum of the squares of numbers 1 to n .

Hence the sum of the squares of the first n natural numbers is equal to $\frac{1}{6}n(n+1)(2n+1)$.

Try and leave the discovery of this formula to your students.

Saroja Sundarajan
Madras

DICTATION FOR GOOD SPELLERS

Outside a cemetery sat a harassed cobbler and an embarrassed oculist, picnicking on a dessicated apple and gazing at the symmetry of a lady's ankle with unparalleled ecstasy.

PUNCTUATION-II

The Semi-Colon (;)

This has sometimes been referred to as the mark of the mature writer. In 'pause-value' it lies between the comma and the full-stop.

i) It emphasizes the separate items in a list

'My purchases included: a game of chess; three new darts; a pack of cards; and a book on "How to play Bridge".'

ii) It marks off two or more separate statements about the same thing, i.e. it acts as a conjunction

'I have a car; it needs regular servicing; it has caused me much trouble in this past year.'

iii) It is also used for emphasis before a conjunction

'I would like to come to your party; but how is it possible when I shall be in London that evening?'

The Colon (:)

1. To introduce a list

The team will be as follows:
The items I bought were:

2. To introduce a quotation

In the famous words of Sir Winston Churchill: '.....'

3. To separate balanced phrases

Sugar is sweet: acid is sour.
Thirteen times he took the test: thirteen times he failed!

4. To break up complex sentences

The house was old and battered by the weather; it had stood empty for many years; the garden was a wilderness, overgrown and dank; each tree looked gaunt and starved:

the drive was pitted and scarred with holes: the once proud gates were falling off their hinges.

The Apostrophe

This punctuation mark has only one use—to show that a letter (or letters) has been omitted.

There are two kinds of word which require the apostrophe—the contraction and the possessive noun. The contraction should not be used in business correspondence of any kind—letters, reports, summaries, etc—unless these include Direct Speech

Contractions include such expressions as: can't; don't; I've; they're; it's (=it is, it has), who's (=who is, who has); mustn't; shouldn't; etc.

The use of the apostrophe in possessive nouns causes problems because there is doubt as to whether the apostrophe should be placed before or after the 's'.

Our ancestors had a special way of indicating that something belonged to somebody. They added 'es' to the possessive noun. 'The young man's mother' was written as 'The young manes mother.....' We now use an apostrophe to indicate the missing letter 'e'. In cases where the noun ends in 's', the apostrophe replaces both the 'e' and the 's'.

When faced with a possessive noun, the following drill will provide a foolproof solution:

1. Turn the problem phrase round to read 'of the', e.g. 'the young mans mother..' = 'the mother of the young man'.
2. Take the last word and (mentally) add 'es', e.g. man-es.

3. Replace the 'e' by the apostrophe, thus :
'the young man's mother...' = 'the young man's mother'.

4. If the last word ends in 's', remove the final 's', e.g. the ladies shoes

- a) the shoes of the ladies
- b) ladieses
- c) ladies = ladies's = ladies'
therefore : the ladies' shoes.

Using this method there is no need to consider singulars and plurals : e.g. the childrens coats

- a) the coats of the children
- b) childrenes
- c) childrens = children's
therefore : the childrens' coats.

Special Note :

1. Possessive pronouns (yours, his, hers, its, ours, theirs) *do not* have apostrophes. But one (e.g. one's wage, one's hopes) does, except in oneself (not *one's self*).
2. In phrases such as 'the boys coats', where there is no indication as to whether there is one or more than one body (*of the boy, or, of the boys?*) the ambiguity is the fault of the writer. Should this occur in an examination, both answers should be given—with perhaps a comment on the ambiguous nature of the questions!

In addition to the *personal* possessives (the man's book : the children's games, etc.) apostrophes are required for *impersonal* possessives, as in 'a minute's notice' (the notice of a minute); 'six weeks' holiday' (a holiday of six weeks); 'in a week's time' (in the time of a week). The principle of reversing the phrase to read 'of the' or 'of a' or simply 'of' is the same and enables one to place the apostrophe correctly.

Double and Single Quotation Marks

As a general guide, double quotation marks should be used for direct speech.

"I think that is a good idea", he said.

"I think", he said, "that that is a good idea".

He said, "I think that that is a good idea".

"I think that that is a good idea".

(Note the placing of the full-stop *inside* the direct speech marks when no *unspoken* words are in the sentence).

Single quotation marks may be used for titles ('I have just read *'Bleak House'*, by Dickens'), newspaper names ("With reference to your letter in *'The Sun'*, I wish to point out that..." though an alternative is to underline the paper's name, and for quotations within direct speech ("He actually had the effrontery to suggest that "if you had any sense you'd have ..."

—to be continued

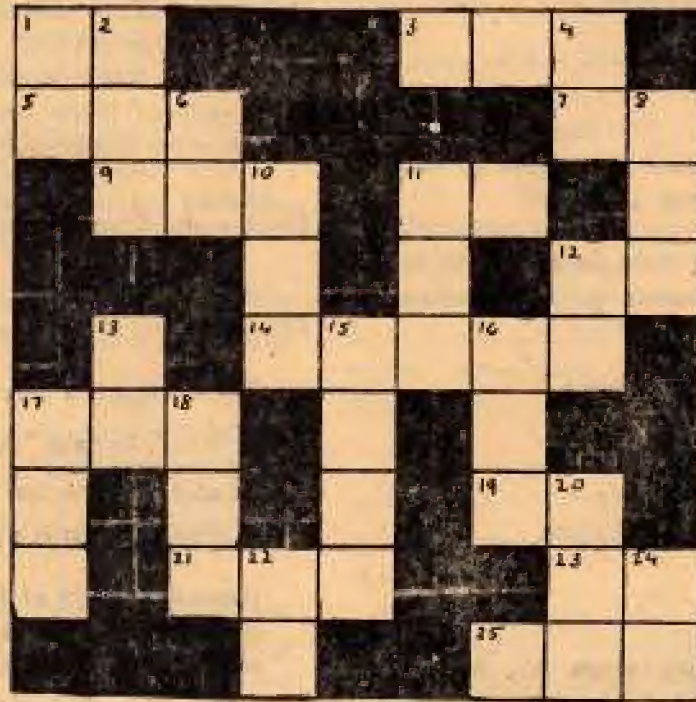
If you can, give him something better
If you can get hold of a man where
He stands and give him a push upwards,
Do so, but do not destroy what he is.

—Vivekananda

शब्द वर्ग पहेलियां

सरदार पटेल विद्यालय के छात्रों द्वारा निमित्त यही तान शब्द वर्ग—पहेलियां प्रस्तुत हैं। हम आशा करते हैं कि यह आपको और आपके छात्रों का मजेदार खगंगा और लाभदायक सिद्ध होगा।

सम्पादक पाथवेस



संकेत - १

बाएं से बाएं

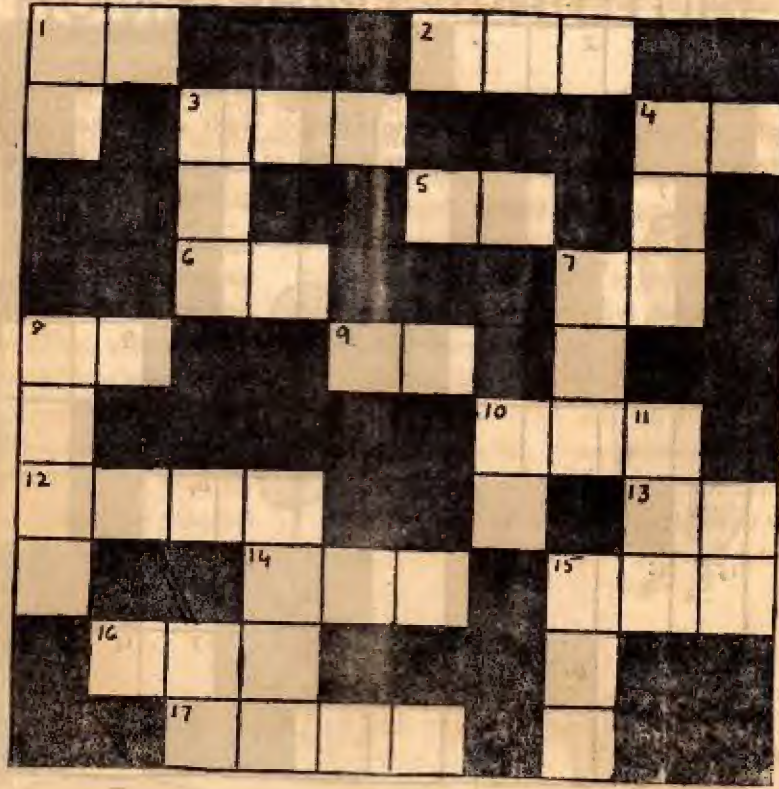
१. हाथ
२. बहने वाला द्रव
५. माँ का प्यार
७. गर्म किया हुआ
८. गुस्सा
११. गर्मी में पिघा जाने वाला पेय
१२. समय/मृत्यु
१४. जो कभी नहीं हो सकता
१७. शक्ति/बल
१६. निशा
२१. बीरबल ने एकबार को.....किया
२३. हार
२५. उत्तर दक्षिण आदि.....

ऊपर से नीचे

१. घोड़ा
२. ईश्वर भजन में लीन होना
४. बुरी आदत
६. आकाश में चमकने वाला
८. भूमि के नीचे का लोक
१०. दुनिया/संसार
११. बोरे की काबू में रखने वाली चीज
१२. इससे हम सुनते हैं
१३. जिससे ब्लैक बोर्ड पर लिखा जाता है
१५. नर्म
१६. कोना
१७. ताल
१८. दया
२०. खेल
२२. लज्जा
२४. ले + बाएं =

चेतन, नीलजन, प्रशांत।

VIII-C



संकेत-२

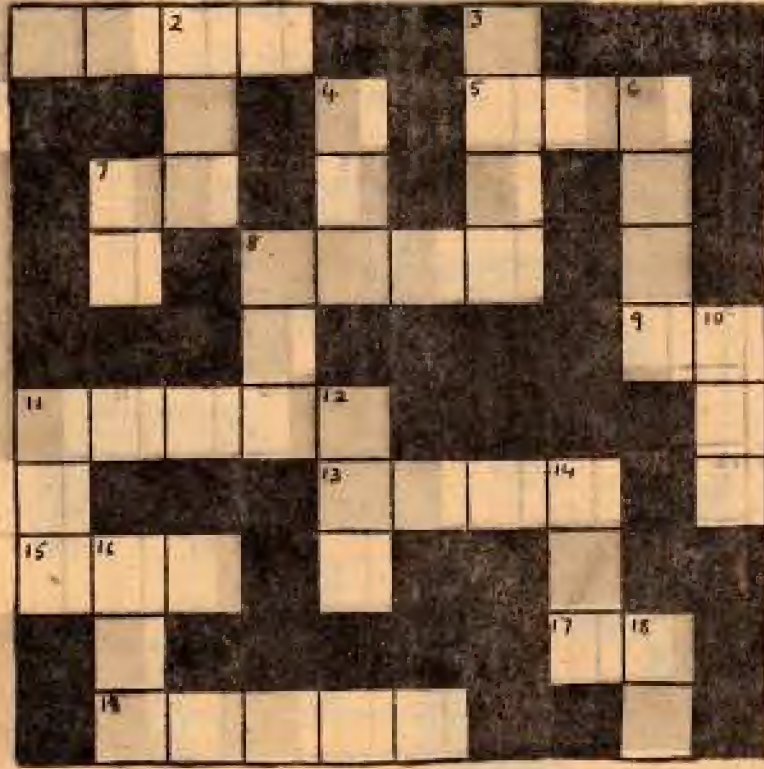
बाएं से दाएं

१. खजाना
२. अमीर खुशहाल
३. जो कभी न मरे
४. धन
५. सुबह
६. ध्येय
७. 'मरना' का विलोम
८. न्यायाधीश
९. वर्ष
१०. निर्माण करना
११. बादल गरजे, बिजली कड़को
———घटा छाई।
१२. संदेह
१३. चारों तरफ———छाया था।
१४. एक कलाकार ने दूसरे कलाकार के चित्र
की——की।
१५. भला आदमी
१६. उपहास करना, अपमान

ऊपर से नीचे

१. करोड़
२. सूखा
३. नाप-तोल
४. विजयी होना
५. भोड़
६. शक्ति
७. किसी चीज को नष्ट करने वाला
८. यात्रा
९. नमस्कार

शान्तनु गुप्ता
VII-A



संकेत-३

बाएँ से दाएँ

१. घर के छाने का भाग
५. छंवेरा
७. मेरे घर का..... यह है
८. बाधा
९. तपस्या
११. जो हानि पहुँचाए
१३. जिसमें नमक डला हो
१५. रथ चलाने वाला
१७. निशा
१८. बड़े दिल वाला

पठार से नीचे

२. भाँ का प्यार
३. बदला
४. उन्नति
६. खून-खराबा
७. यह आम..... हुआ है।
८. बार
१०. पर्वत
११. दुर्घटना
१२. सोना
१४. दृश्य
१६. खाने पीने का कच्चा सामान
१८. त्वाम

गौरव, राहुल, अभिजीत
VIII-C

(कृपया पृष्ठ १४ देखिए)

THUMB-PRINT PICTURE

Stamped ink-pads are available in several colours—purple, red, black, blue and green. Children can have lots of fun converting their thumb (or other finger) impressions into pictures like those shown below. Use a felt pen or pencil to fill in details like eyes, hands, wings etc.



How Effective are we as Teachers ?

A competent and conscientious teacher is the vital spark in education. Yet few of us spend any time studying the mechanism of teaching and learning—the two inseparable attributes of structured education. The art and technique of teaching which we learn largely through on the job training, can only be appreciated if we take a good look at the principles of good teaching.

Apart from a proper organization of the entire course of instruction, a good teacher must find the most effective way of transferring a bulk of knowledge to the student. A primary concern of the student is the objectives of the course. We must therefore clearly indicate

what we expect the student to be able to do as a result of the process of instruction. The goals of student learning can only be achieved if the objectives are explicitly stated. This will facilitate transfer of specific knowledge, facts and their use in problem solving, thereby developing techniques of analysis and synthesis.

The process of learning depends, to a great extent, on the enthusiasm and interest created by the teacher. Teaching to some extent is showmanship and hence should be entertaining with lasting memories of the concepts covered. It is imperative that we provide an environment for the active participation of the student, a

forum for the student to communicate thoughts and ideas with ease.

A teacher distinguishes himself/herself by the way he/she answers questions. Questions often cover a communication failure and care must be taken in dealing with them. Even if the question demonstrates the inattentiveness or otherwise of a student, a good teacher must try to answer the question without belittling the student. A smart teacher should have the ability to orchestrate the answer in such a way that it naturally leads to the next topic. But we should not rush to answer all questions. Instead we should sometimes allow a student to muddle his way through to the answer—for such muddling is at the heart of all creative thinking.

A friendly teacher showing a genuine interest in students outside the classroom may well motivate them to try harder, thus increasing the effectiveness of teaching.

Remember students are human beings too!

For GOOD HUMAN RELATIONSHIPS

- * Speak to students as people.
- * Be sincerely cordial.
- * Smile and call them by name.
- * Be genuinely interested in their problems.
- * Be friendly and helpful.
- * Consider the feelings of others—students, parents and colleagues.
- * Be alert to render service.
- * Respect the opinions of other.
- * Praise generously, criticize cautiously.

शब्द वर्ग पहेलियों के उत्तर

१. बाएँ से दाएँ :- १. कर ३. तरल ५. ममता ७. तप ९. नाराज ११. लस्सी १२. काल
१४. नामुमकिन १७. ताकत १९. रात २१. सलाम २३. माला २५. दिशाएँ

ऊपर से नीचे :- १. कम २. रमता ४. नत ६. तारा ८. पाताल १०. जमाना ११. लगाम
१२. कान १३. चाँक १५. मुलायम १६. किनारा १७. तालाब १८. तरस
२०. तमाशा २२. लाज २४. लाएँ

२. बाएँ से दाएँ :- १. कोष २. समृद्ध ३. धमर ४. पंसा ५. प्रातः ६. लक्ष्य ७. जीना ८. जज
९. साल १०. बनाना १२. घनघोर १३. शक १४. सन्नाटा १५. नकल
१६. शरीक १७. तिरस्कार

ऊपर से नीचे :- १. कीटि ३. अकाल ४. पैमाना ७. जोतना ८. जमघट १०. बल
११. नाशक १४. सफर १५. नमस्ते

३. बाएँ से दाएँ :- १. वरामदा ५. तिमिर ७. पला ८. प्रतिरोध ९. तप ११. हानिकारक
१३. तमकीन १५. सारथि १७. रात १८. दरियादिल

ऊपर से नीचे :- २. समता ३. प्रतिबोध ४. प्रगति ६. रक्तपात ७. पका ८. प्रहार १०. पहाड़
११. हादसा १२. कनक १४. नजारा १६. रसद १८. तज